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10/662,406	09/16/2003	Joong Seo Park	YHK-0119	9669

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EXAMINER	
SHERMAN, STEPHEN G	

ART UNIT	PAPER NUMBER
2629	

DATE MAILED: 06/13/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/662,406	PARK ET AL.	
	Examiner	Art Unit	
	Stephen G. Sherman	2629	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *19 May 2006*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *5-8,14-17 and 19-30* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *5-8,14-17 and 19-30* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *17 November 2003* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

1. This office action is in response to the amendment filed the 19 May 2006. Claims 5-8, 14-17 and 19-30 are pending. Claims 1-4, 9-13 and 18 have been cancelled.

Response to Arguments

2. Applicant's arguments filed the 19 May 2006 have been fully considered but they are not persuasive.

On page 9, the last paragraph, the applicant states: "The Tajima patent discloses a driver for a plasma display panel. The driver includes a circuit 75 which re-arranges the sequence of sub-frames in a frame of input data. (See Figure1). This results in an adjustment of the grey-scale level of the image shown on the display. However, circuit 75 does not –rearrange the sub-frames of input data based on "a grey level distribution of said data" as cited in claim 5. Unlike claim 5, the Tajima circuit re-arranges the sub-fields of input data based on a vertical synchronization signal (V_{SYNC}) received from an interface circuit 70," and therefore Tajima does not disclose "an adjuster for adjusting at least one of the number of sustaining pulses or a sub-field arrangement in accordance with a gray level distribution of said data." The examiner respectfully disagrees.

The vertical synchronizing signal is used to control the frame counter 79 in order to output a frame selection signal (FQ) to the sub-frame sequence pattern storage means 78 (Figure 1) in order to "SELECT THE **REGION** THAT INDICATES THE SEQUENCE OF SUSTAINED DISCHARGE OF THE SUB-FRAMES WITHIN A FRAME." (Column 16, lines 34-40)(Emphasis added.). The vertical synchronization signal is a **timing signal** that is used in order for the sub-frame sequence pattern storage means 78 to select the proper frame in which the sub-fields are to be adjusted, therefore the output of the sub-frame sequence pattern storage means 78 is based on the vertical synchronizing signal, however, the vertical synchronizing signal has nothing to do with choosing the sub-frame pattern. The sub-frame sequence pattern storage means 78 receives input RCA1 from sub-frame counter 72 and then outputs RCA1', which are intensity data bit number signals. As explained in column 16, lines 44-48 the "sub-frame sustained discharge sequence pattern storage means 78 outputs the intensity data bit number (RCA1') corresponding to the sub-frame with in the frame from the region selected by the frame selection signal (FQ)." Then column 16,line 66 to column 17, line 3 explains that: "The output signal of this sub-frame forming means 73 is input to the sub-frame counter 72, the sub-frame counter 72, in response to this input signal, performing control of the sub-frame sustained discharge sequence pattern storage means 78."

Column 16, lines 6-14 explains that the gray-scale level adjustment means 75 establishes which sub-frames have mutually differing sustained discharge periods are to be used, meaning that the grey-level adjustment means 75 has to detect which sub-

frames have differing sustained discharge periods, i.e. the grey level distribution, and then adjust the sub-frames, which would be done based on the grey level distribution.

Specification

3. The disclosure is objected to because of the following informalities:

a) page 9, line 30 states "APL controller *17*" which should read "APL controller *27*."

b) page 10, line 11 states "...to thereby *calculates*" which should read "..to thereby *calculate*."

c.) page 11, line 11 states "*An* function and operation" which should read "*A* function and operation."

d) page 13, lines 22-23 refer to gray level *calculator* 7 where Figure 6 actually shows gray level *detector* 7.

e) page 14, line 28 states "APL controller 42" which should read "APL controller 67."

f) page 16, line 17 states "data driver 68" which should read "data driver 6."

g) page 16, lines 26-34 refer to Figures 7A and 7C as both being gray level distributions where there are many data having middle gray level of data for one frame, however, both Figures do not show data having middle gray level of data for one frame.

h) page 17, lines 14, 16 and 19 read "selector 83" which should read "selector 81."

i) page 19, line 16 reads "sub-field arrangement/alignment adjuster 8" which should read "sub-field arrangement/alignment adjuster 9."

Appropriate correction is required.

Claim Rejections - 35 USC § 102

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States. .

5. Claims 5-6, 14-15, 21-22 and 28-29 are rejected under 35 U.S.C. 102(b) as being anticipated by Tajima et al. (US 6,222,512).

Regarding claim 5, Tajima et al. disclose a driving apparatus for a plasma display panel in which one frame period is time-divided into a plurality of sub-fields each given by a certain weighting value (Figure 1 shows a driving apparatus for a plasma display panel and column 15, lines 36-51 explain that the frame period is divided into a plurality of sub-fields.), said driving apparatus comprising:

a gray level detector for detecting a gray level distribution of a data (Figure 1, gray-scale level adjustment means 75 is said in column 16, lines 6-14 to establish which sub-frames having mutually differing sustained discharge are to be used, which the

examiner interprets as detecting the distribution of the gray level data since the sub-field would be chosen based on the gray scale to be displayed.) and

an adjuster for adjusting at least one of the number of sustaining pulses or a sub-field arrangement in accordance with a gray level distribution of said data (Figure 1, the gray-scale level adjustment means 75 is stated in column 16, lines 1-14 to establish which sub-frames are to be combined and how these are to be arranged in sequence.).

Regarding claim 6, Tajima et al. disclose the driving apparatus as claimed in claim 5, wherein said adjuster adjusts both the number of sustaining pulses and- a sub-field arrangement accordance with the gray level distribution of said data (Please refer to the rejection of claim 5.).

Regarding claim 14, this claim is rejected under the same rationale as claim 5.

Regarding claim 15, this claim is rejected under the same rationale as claim 6.

Regarding claim 21, Tajima et al. disclose the driving apparatus of claim 5, wherein the number of the sub-fields after said adjustment equals the number of sub-fields before said adjustment for driving the panel (Column 16, 14-33 explain that the sub-fields are re-arranged, but the number of subfields stays the same.).

Regarding claim 22, Tajima et al. disclose the driving apparatus of claim 5, wherein the weighting value assigned to each of the predetermined number of sub-fields is same before and after said adjustment (Column 16, 14-33 explain that the sub-fields are re-arranged, such as SF6 in the middle and SF1 and SF2 on the ends, but the weighting value assigned to them is the same.).

Regarding claim 28, Tajima et al. disclose the driving apparatus of claim 5, wherein the adjuster includes: a sub-field arrangement selector which selects one of a plurality of pre-stored sub-field arrangements based on the gray-level distribution of said data (As stated in the rejection of claim 5, Figure 1 shows gray-scale level adjustment means 75 has sub-frame sequence pattern storage means 78.).

Regarding claim 29, Tajima et al. disclose the driving apparatus of claim 28, wherein the sub-field arrangements are predetermined to reduce contour noise for different regions having a largest portion of the gray-level distribution (Column 16, lines 21-28 explain that the sequences, i.e. arrangements are predetermined and column 42, lines 53-60 explain that this is done in order to suppress a false colored phenomenon.).

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

7. The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

8. Claims 7-8 and 16-17 rejected under 35 U.S.C. 103(a) as being unpatentable over Tajima et al. (US 6,222,512) in view of Tanabe et al. (US 2003/0011626).

Regarding claim 7, Tajima et al. disclose the driving apparatus as claimed in claim 5.

Tajima et al. fail to teach wherein said adjuster reduces the number of sustaining pulses when gray levels of said data concentrate on a low gray level

Tanabe et al. disclose the driving apparatus as claimed in claim 5 wherein said adjuster reduces the number of sub-fields when gray levels of said data concentrate on a low gray level (Figures 8A-8H and paragraphs [0079]-[0088] show that when the gray scale number is high there is seven or eight subfields, which is an increase in the number of sustaining pulses compared to when there are less sub-fields, since each sub-field contains a sustain pulse as described in Tajima et al.).

Therefore it would have been obvious to "one of ordinary skill" in the art at the time the invention was made to use the sub-field reduction method taught by Tanabe et al. with the driving apparatus as taught by Tajima et al. such that the number of sustain pulses would be reduced/increased in order to produce less power consumption as compared to when the sustain process is performed in each sub-field.

Regarding claim 8, Tajima et al. disclose the driving apparatus as claimed in claim 5.

Tajima et al. fail to teach wherein said adjuster increases the number of sustaining pulses when gray levels of said data concentrate on high gray level

Tanabe et al. disclose a driving apparatus wherein said adjuster increases the number of sustaining pulses when gray levels of said data concentrate on high gray

level (Figures 8A-8H and paragraphs [0079]-[0088] show that when the gray scale number is high there is seven or eight subfields, which is an increase in the number of sustaining pulses compared to when there are less sub-fields, since each sub-field contains a sustain pulse as described in Tajima et al.).

Therefore it would have been obvious to "one of ordinary skill" in the art at the time the invention was made to use the sub-field reduction method taught by Tanabe et al. with the driving apparatus as taught by Tajima et al. such that the number of sustain pulses would be reduced/increased in order to produce less power consumption as compared to when the sustain process is performed in each sub-field.

Regarding claim 16, this claim is rejected under the same rationale as claim 7.

Regarding claim 17, this claim is rejected under the same rationale as claim 8.

9. Claims 19-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tajima et al. (US 6,222,512) in view of AAPA (Figure 1 and page 1, line 1 to page 4, line 30 of the specification.).

Regarding claim 19, Tajima et al. disclose the driving apparatus of claim 5.

Tajima et al. fails to teach that the apparatus further comprises: an average picture level controller which detects an average brightness of said data and outputs

information to set a number of sustaining pulses in each of a predetermined number of sub-fields corresponding to said data.

AAPA discloses a driving apparatus for a plasma display panel comprising of an average picture level controller (Figure 1, item 17) which detects an average brightness of said data and outputs information to set a number of sustaining pulses in each of a predetermined number of sub-fields corresponding to data (Page 3, line 29 to page 4, line 7 of the specification.).

Therefore it would have been obvious to "one of ordinary skill" in the art at the time the invention was made that the plasma display panel taught by Tajima et al. include and APL controller as taught by AAPA in order to allow for the adjustment of the number of sustaining pulses to provide for a more stabilized brightness of the display.

Regarding claim 20, Tajima et al. and AAPA disclose the driving apparatus of claim 19.

AAPA also disclose wherein the average picture level detector detects the average brightness of said data as received from an inverse gamma controller (Figure 1 APL controller 17 receives its input from inverse gamma controller 11B.).

10. Claim 23-27 and 30 is rejected under 35 U.S.C. 103(a) as being unpatentable over Tajima et al. (US 6,222,512).

Regarding claim 23, Tajima et al. disclose the driving apparatus of claim 5.

Tajima et al. fail to teach wherein the adjuster generates a histogram of gray-level values corresponding to the gray-level distribution of said data, the adjuster performing said adjustment based on the histogram.

However, it would have been obvious to "one of ordinary skill" in the art at the time the invention was made to modify the adjuster taught by Tajima et al. to generate a histogram of gray-level values corresponding to the gray-level distribution of said data with the adjuster performing the adjustment based on the histogram because this would allow for the determination of how the data is distributed and how it should be changed.

Regarding claim 24, Tajima et al. disclose the driving apparatus of claim 5, wherein the detector divides the gray-level distribution into a plurality of predetermined regions (Column 16, lines 34-40 explain that a region is chosen in which the subfield arrangement is chosen.).

Tajima et al. fail to teach wherein the adjuster compares the gray-level distribution in the regions and adjusts the number of sustaining pulses in one or more of the predetermined sub-fields based on the comparison.

However, it would have been obvious to "one of ordinary skill" in the art at the time the invention was made to modify the adjuster taught by Tajima et al. to compare the gray-level distribution in the regions and adjust the number of sustaining pulses in

one or more of the predetermined sub-fields based on the comparison because this would allow for a more uniform brightness of the display over time.

Regarding claim 25, Tajima et al. disclose the driving apparatus of claim 24.

Tajima et al. fail to explicitly teach wherein the adjuster performs said comparison to determine a region having largest gray-level distribution and adjusts the number of sustaining pulses in one or more of the sub-fields to produce a corresponding change in brightness of the displayed image.

However, it would have been obvious to "one of ordinary skill" in the art at the time the invention was made to modify the adjuster taught by Tajima et al. to perform the comparison to determine a region having largest gray-level distribution and adjusts the number of sustaining pulses in one or more of the sub-fields to produce a corresponding change in brightness of the displayed image in order to provide for a more uniform display output to the user for a better viewing experience.

Regarding claim 26, Tajima et al. disclose the driving apparatus of claim 25.

Tajima et al. fail to explicitly teach wherein the adjuster decreases the number of sustaining pulses to less than a predetermined references value when the largest gray-level distribution is located in a region corresponding to a low range of gray levels.

However, it would have been obvious to "one of ordinary skill" in the art at the time the invention was made to modify the adjuster taught by Tajima et al. to decrease the number of sustaining pulses to less than a predetermined references value when

the largest gray-level distribution is located in a region corresponding to a low range of gray levels because lower gray level regions don't use as many sustaining pulses to create a desired brightness level.

Regarding claim 27, Tajima et al. disclose the driving apparatus of claim 25.

Tajima et al. fail to explicitly teach wherein the adjuster increases the number of sustaining pulses to more than the predetermined reference value when the largest gray-level distribution is located in a region corresponding to a high range of gray levels.

However, it would have been obvious to "one of ordinary skill" in the art at the time the invention was made to modify the adjuster taught by Tajima et al. to increase the number of sustaining pulses to more than the predetermined reference value when the largest gray-level distribution is located in a region corresponding to a high range of gray levels because higher gray level regions use more sustaining pulses to create a desired brightness level.

Regarding claim 30, Tajima et al. disclose the driving apparatus of claim 29.

Tajima et al. fail to explicitly teach wherein: in a first arrangement, the number of sustaining pulses in the sub-fields changes in ascending order, in a second arrangement, the number of sustaining pulses in a first portion of the sub-fields changes in ascending order, the number of sustaining pulses in a second portion of the sub-fields includes a maximum number of sustaining pulses, and the number of sustaining pulses in a third portion of the sub-fields changes in descending order; and in a third

arrangement, the number of sustaining pulses in a first portion of the sub-fields changes in ascending order and the number of sustaining pulses in a second portion of the sub-fields are set to a same number of sustaining pulses, however, Tajima et al. do suggest of placing the sub-frames in a descending order (Column 32, lines 38-50).

Therefore it would have been obvious to "one of ordinary skill" in the art at the time the invention was made that the predetermined sub-field arrangements taught by Tajima et al. would have a first arrangement, the number of sustaining pulses in the sub-fields changes in ascending order; a second arrangement, the number of sustaining pulses in a first portion of the sub-fields changes in ascending order, the number of sustaining pulses in a second portion of the sub-fields includes a maximum number of sustaining pulses, and the number of sustaining pulses in a third portion of the sub-fields changes in descending order; and in a third arrangement, the number of sustaining pulses in a first portion of the sub-fields changes in ascending order and the number of sustaining pulses in a second portion of the sub-fields are set to a same number of sustaining pulses in order to allow for the reduction of false contour by using an appropriate sub-field arrangement.

Conclusion

11. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP

§ 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

12. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Sagano et al. (US 6,873,308) discloses an image display apparatus capable of properly correcting or adjusting, with small scale hardware, variations in drive conditions due to electric resistance of matrix wiring on a display panel.

Nagakubo (US 5,757,343) discloses a luminance adjusting apparatus for a plasma display panel that allows for the adjustment of the luminance of a whole panel in a continuous manner.

13. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Stephen G. Sherman whose telephone number is (571) 272-2941. The examiner can normally be reached on M-F, 8:00 a.m. - 4:30 p.m..

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Amr Awad can be reached on (571) 272-7764. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

SS

8 June 2006

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